cumstances as the creeper, its tendrils manifested the same tendency to recede from the light. When first emitted, they pointed upwards; but the angle gradually increased, and ultimately they pointed directly downwards when no object was within their reach to which they could attach themselves. The ultimate direction was in all instances towards the darkness of the ground, whether the plants were trained upwards, horizontally, or downwards.

There was, however, this difference observable between the tendrils of the vine and those of the Virginia creeper: those of the vine could be made to return to any position which they had quitted, by changing the direction of the light; but those of the creeper never returned to a situation from which they had once receded; as the tendrils of the vine are, moreover, separated into two divisions, they do not often fail of coming into contact with adjacent objects; and the effect of contact is almost immediately visible. They bend more firmly toward the body, and attach themselves by twining round it.

The organization of the tendril, by which it is adapted to perform these motions, appears to the author very similar to that of the young succulent shoot. It is abundantly provided with vessels; and it seems not improbable that a very considerable quantity of the moving fluid of the plant passes through them, and that there is a close connexion between their vascular structure and their motion, as appears more especially in the act of grasping an object. The external pressure of the body on one side will probably impede the motion of the fluids on that side of the tendril, and occasion greater extension of the opposite side in giving passage to a greater proportion of sap. In conformity to this explanation, it is observed, that the sides of the tendrils that are in contact with the substance embraced are visibly compressed and flattened.

*Observations on the Measurement of three Degrees of the Meridian conducted in England by Lieut.-Col.* William Mudge. *By Don* Joseph Rodriguez. *Communicated by* Joseph de Mendoza Rios, *Esq. F.R.S.* Read June 4, 1812. [*Phil. Trans.* 1812, *p.* 321.]

After tracing the history of the several measurements that have been made from time to time in different parts of the world, the author observes, that little doubt would have remained as to the earth being flattened at the poles, had not the English measurement given an opposite result; the degree at the northern extremity being found equal to 60,766 fathoms, while that at the southern appeared to be 60,884.

Colonel Mudge's estimate of the linear measure of a degree is made by dividing the number of fathoms measured in linear extent of an arc by the number of degrees and parts of a degree ascertained by observations of stars. Don Joseph Rodriguez has followed a different course. He assumes as data the linear extent of Col. Mudge's base line, and the horizontal angles of his triangles ascertained by observation. He assumes, also, that the figure and dimensions of the earth

are known by other measurements, and thence infers what ought to have been the angles ascertained by Col. Mudge's astronomical observations.

Col. Mudge's base in fathoms is first converted into toises, of which the logarithm is taken as the logarithm of an arc. The radius of that arc being assumed from the supposed figure of the earth, its angular extent, its logarithmic sine, and chord, are inferred by the method of Delambre. The horizontal angles measured are then corrected for spherical error, so as to convert the triangles into spherical triangles, the sides of which are found first as logarithmic sines, and thence the logarithmic arcs are deduced. The azimuths of these being also known, the portions of the meridian to which they each correspond are computed both in angular and linear measure: the results are given by the author in two tables, one of which is deduced from the eastern series of triangles, and the other from the western series.

The angular extent of the whole arc thus calculated is $2^\circ\ 50'\ 21''{\cdot}97$. The observed angle differs from this by $1''{\cdot}38$, being $2^\circ\ 50'\ 23''{\cdot}35$.

In making separate estimates of the two portions of this arc, that are to the north and south of the central station at Arbury Hill, he finds that the former exceeds its calculated amount by $4''{\cdot}77$; while in the latter the calculated extent is greater than that deduced from astronomical observations by $3''{\cdot}39$. He therefore infers that the astronomical observations at Arbury Hill must be erroneous nearly to the amount of $5''$, notwithstanding the goodness of the instruments and the skill and care of the observer.

By a mode of calculation similar to the foregoing, made upon the measurement in Lapland, Don Joseph Rodriguez arrives at a result which differs only $0''{\cdot}6$ from that of M. Svanberg; and by the same method, with respect to the measurement in Bengal by Major Lambton, the difference between observation and calculation is only $0''{\cdot}53$.

A portion of the French measurement between Dunkirk and Paris, similarly estimated, is not found to accord so well with the author's calculations, which make a difference of $2''{\cdot}60$ more than appeared by observation.

A similar disagreement, it is observed, was also found by M. Mechain in the very short distance between Montjui and Barcelona, the latitudes of which, as determined by a very long series of zenith distances, do not agree with the results of measurement by as much as $3''{\cdot}24$.

Local attractions were supposed to be the cause of this irregularity; and Col. Mudge also was of opinion, that the irregularities which occur in his measurements are to be ascribed to deviations of the plumb-line from local attractions. But the author of the present communication thinks they should rather be ascribed to the observations themselves than to any extraneous source; since the observations of different stars give results that differ more than $4''$ from each other.